

Claims

- [c1] 1.A corrosion monitoring system for connection to a pipe transporting a fluid or fluid mixture, said system comprising:
- (a)a test fluid circuit comprising a galvanic cell comprising an anode, a cathode and an electrical insulator disposed between the anode and cathode;
 - (b)a pipe connection comprising a draw-off valve for supplying fluid to the test fluid circuits;
 - (c)a fluid return connection for returning fluid to the pipe at point downstream from the pipe connection;
 - (d)a pump disposed between the galvanic cell and the fluid return connection, for drawing fluid through the test fluid circuit and returning fluid to the fluid return connection; and
 - (e)an ammeter operatively connected to the anode and the cathode.
- [c2] 2.The system of claim 1 further comprising a second fluid circuit having an intake located downstream from the pipe connection and upstream from the galvanic cell and an outlet located between the galvanic cell and the pump, and comprising means for measuring flow rate

through the second fluid circuit.

- [c3] 3.The system of claim 1 wherein the galvanic cell is preceded by a length of substantially straight pipe equal to at least about 10 times the inner diameter of the cell.
- [c4] 4.The system of claim 3 wherein the galvanic cell is preceded by a length of substantially straight pipe equal to at least about 15 times the inner diameter of the cell.
- [c5] 5.The system of claim 3 wherein the galvanic cell is succeeded by a length of substantially straight pipe equal to at least about 5 times the inner diameter of the cell.
- [c6] 6.The system of claim 5 wherein the galvanic cell is succeeded by a length of substantially straight pipe equal to at least about 10 times the inner diameter of the cell.
- [c7] 7.The system of claim 1 wherein the anode is comprised of a substantially similar metal or alloy as that of the pipe.
- [c8] 8.The system of claim 7 wherein the cathode comprises nickel.
- [c9] 9.The system of claim 8 wherein the cathode comprises stainless steel or nickel-plated ferrous pipe.
- [c10] 10.The system of claim 7 wherein the cathode is com-

prised of a metal lower on the electromotive series than the anode.

- [c11] 11.The system of claim 1 wherein the cathode presents a larger surface area to the fluid than the anode.
- [c12] 12.The system of claim 11 herein the ratio of the surface area of the cathode to the surface area of the anode is at least about 1.5.
- [c13] 13.The system of claim 12 wherein the ratio is about 3.
- [c14] 14.The system of claim 1 wherein the cathode is downstream from the anode.
- [c15] 15.The system of claim 1 wherein the anode is downstream from the cathode.
- [c16] 16.A method of monitoring corrosion or the persistence of a corrosion inhibitor, comprising the steps of:
 - (a)providing a system as claimed in any one of claims 1 to 15;
 - (b)injecting a corrosion inhibitor into the pipe while operating the system pump; and
 - (c)monitoring or recording a galvanic current between the anode and cathode.
- [c17] 17.The method of claim 15 wherein the pump is operated at speed such that flow velocity through the test cell

is substantially similar to flow velocity through the pipe.

[c18] 18. The method of claim 16 wherein the fluid is allowed to flow through the test cell prior to application of the inhibitor.